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AUTO-TUTORIAL AND MOBILE-TUTORIAL LABORATORY TECHNIQUES IN NURSING EDUCATION.

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USE OF AN AUTOTUTORIAL PROGRAM IN A MATHEMATICS UNIT FOR DELTA COLLEGE NURSING STUDENTS RESULTED IN FAVORABLE STUDENT REACTION AND A HIGHER PERCENTAGE OF SUCCESS THAN IN A GROUP TAUGHT BY CONVENTIONAL METHODS. THIS SUCCESS LED TO THE DEVELOPMENT OF 8-MILLIMETER FILMS, ACCOMPANIED BY AUDIO EXPLANATIONS ON TAPE, FOR DEMONSTRATING NURSING TECHNIQUES AND COMPLEX SITUATIONS WHICH ARE NOT ORDINARY STUDY MATERIAL IN THE TRADITIONAL CLASSROOM. THE STUDENT USING THE EQUIPMENT WAS ABLE TO STOP THE PROCESS AT ANY TIME FOR CLOSE STUDY, AND HE COULD REVIEW THE LEARNING EXPERIENCE AS MANY TIMES AS DESIRED. IT WAS EXPECTED THAT THE PROCESS WOULD (1) RELEASE INSTRUCTORS TO GIVE INDIVIDUAL INSTRUCTION AND SUPERVISION, (2) UTILIZE FACULTY IN TEACHING GREATER NUMBERS OF STUDENTS WITHOUT LOSS OF INSTRUCTIONAL QUALITY, (3) PERMIT STUDENTS TO PROGRESS AT THEIR OWN OPTIMUM SPEEDS, AND (4) FACILITATE THE USE OF THE MATERIALS BEYOND THE COLLEGE WHERE THEY WERE DEVELOPED. THIS PAPER WAS PRESENTED AT THE NATIONAL CONFERENCE FOR ASSOCIATE DEGREE PROGRAMS IN NURSING (3RD, ST. LOUIS, MISSOURI, MARCH 4-5, 1966). (WO)

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Auto-tutorial and Mobile-tutorial Laboratory Techniques in Nursing Education

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In the summer of 1964 the Delta nursing faculty attended a workshop at Purdue University to prepare for the Associate Degree Program. At that time we had an opportunity to visit Dr. Postlethwait's botany laboratory: this experience served as an impetus for us to apply the same principles in the teaching of nursing techniques.[1] We decided as a group to utilize the facilities available to us at Delta College; namely, the language laboratory and excellent tape recording facilities.

We had usually presented a unit, Mathematics for Nursing, as part of Fundamentals of Nursing. We decided to try a preliminary application of the auto-tutorial techniques, utilizing the mathematics unit of study. For the purposes of our study the group of 31 students was randomly divided into two groups. The control group met for 10 hours of the traditional classroom experience, constituting primarily lecture and problem-solving. The experimental group of 15 students net as a group with the instructor for approximately 5-15 minutes each week. The balance of the learning experience was provided in the language laboratory, constituting five lessons averaging 30 minutes each. Students had the opportunity to repeat any lesson at any time the student desired. The instructor was available for consultation during a prescribed period of time. In the experimental group the objectives for each lesson were listed, the equipment needed for the lesson, and a worksheet were provided. For example, the objectives for lesson one included:

(1) to learn what is a cubic centimeter; what is a milliliter

(2) to learn how many cubic centimeters are in a teaspoon, dram, ounce

(3) to learn how to read, write, and use the symbols for dram and ounce

(4) to learn the equivalents between the household, apothecary, and metric systems

For Lesson I the equipment which the student worked with included: a medicine glass, teaspoon, tablespoon, dropper, syringes of varying sizes, container of water, and worksheets. The student was given basic information by means of an audio tape. With specific instructions he performed tasks wherein he measured centimeters and teaspoons and compared the different measurement using the specified equipment. The student practiced writing the symbols with an example and had an opportunity to compare the various measurement systems, both by doing and by means of a printed chart. Following the lesson or the auto-tutorial laboratory experience, the student had additional problems to solve individually (home work). When the student was ready, and during a prescribed time period, he presented himself for a quiz covering the materials for a lesson. Each of the lessons followed in sequence and built upon the previous experiences.

The students' reactions to the auto-tutoriallaboratory presentation varied as evidenced in their responses to a questionnaire. Fifty per cent of the experimental group classified their learning experience as interesting, 20 per cent classified their experience as stimulating, 13 per cent classified the experience as exciting, and 13 per cent as satisfactory. One student did not find any of the responses provided to be acceptable and indicated that the learning experiences were "helpful and complete." All 15 of the students, or 100 per cent, indicated that the quality of the auto-tutorial learning experience was an improvement as compared with other classroom learning. Eighty-six per cent of the students strongly urged the use of the auto-tutorial methods based on their experience in the laboratory and considering some recommended modifications. One of the students was undecided, and one student indicated that it would be preferred to have both the auto-tutorial and the classroom experience, or a combination of both. (The total intent includes such a plan.) In comparing the method of presentation in the auto-tutorial laboratory to their previous

classroom learning, 33 1/3 per cent of the experimental group classified the presentation as superior; 66 2/3 per cent classified the presentation as satisfactory.

The length of time for group discussion was brief; namely, 5-15 minutes. Sixty per cent of the students evaluated this time as satisfactory. Forty per cent considered it to be too short. Both the experimental and the control group were given the same final examination. The control group of 16 students had 9 students passing with a score of 70 per cent or better, constituting 56 per cent of the control group. Seven students failed with a score of less than 70 per cent, constituting 44 per cent failures. In the experimental group of 15 students, eleven students, or 73 per cent, passed with a score of 70 per cent or better. Four students failed with a score of less than 70 per cent, constituting 27 per cent.

Achievement on Final Exam

	N = 16 Control Group	N = 15 Experimental Group
Passed	56%	73%
Failed	44%	27%

We admit that this group was not sufficiently large to produce valid comparisons. At the same time, our faculty considered the difference to be sufficiently significant to warrant further work with these techniques. With this encouragement we began to produce 8 mm films demonstrating nursing techniques and complex situations which are not ordinarily study material in the traditional classroom. For example, we went to the homes of children in various age groups and photographed their behavior and activities in their home environment, both with their parents and their siblings. We have used the 8mm films in preliminary fashion with faculty description and discussion accompanying the films. In our projected work with these materials we expect to use the 8mm films with audio tapes, transparencies, written verbal descriptions projected on a screen (comparable to those used in reading improvement laboratories), and specific equipment involved in the technique. For example, a film shows how to change a surgical dressing

in a step by step fashion with an actual patient and the equipment ordinarily used for the procedure. The audio tape describes the procedure in step by step fashion accompanying the film. The student has an added advantage in that he may stop the film and/or the audio tape at any point for closer study. The student may review the learning experience as many times as he desires. Following the visual and audio experience, the student will then do the dressing. The word directions in front of him on a screen are controlled by him as to the speed of progression. He handles the equipment as often as he needs to in order to learn the technique. The auto-tutorial laboratory utilizes as many stimulae as possible to enforce the learning. The instructor would be available to assist the student at any stage and to evaluate the student.

By utilizing the auto-tutorial materials developed, the following objectives will be achieved to some degree:

1. Release the instructor for the individual student teaching needed in areas of patient communication and adaptations of techniques in specific situations.
2. Utilize faculty fully in teaching greater numbers of students without loss of instructional quality.
3. Permit the student to proceed at his individual speed to develop the necessary competencies in the nursing major.
4. Facilitate the use of the materials developed on a local, regional, and/or national basis in institutions conducting nursing education programs.

Using the multi-sensory approach which has not been extensively attempted in nursing education to date, will allow one nursing instructor to teach 15 or more students in the clinical area without loss in quality of instruction. Further, students are able to learn selected materials at their own rate, thus enabling faculty to be more flexible in the use of time in assisting the more able student to gain greater knowledge and the less gifted student to become more proficient in the specific area of study.

The student will request an oral or written examination and/or will demonstrate a skill when he feels secure in his knowledge before a designated time interval has elapsed. This has several positive aspects; namely, (1) helps the student maintain motivation, (2) helps the student gain satisfaction in mastering techniques needed in nursing, (3) reduces the frustration encountered by either the very slow or rapid learner, (4) allows the instructor more flexibility in utilizing time and (5) maintains the quality of instruction, while increasing the number of students under a faculty member's supervision.

The mobile tutorial unit will be in the instructor's possession in the hospital laboratory whenever he has a group of students caring for patients. As the student or faculty determines the need for reviewing a nursing technique under study or practice (for example, the student is going to change a dressing for a patient today), the student secures the materials; namely, the single concept film and accompanying explanations, and reviews these immediately prior to performing a specific procedure or technique. The student is able to reinforce his learning, utilizing these materials at any time. For example, an advanced student may not have had an opportunity to do a specific technique recently. The student can quickly review, reinforce, and recall his previous learning by utilizing the materials in the mobile-tutorial unit. At the same time, when the instructor observes that a student is deficient in a specific technique, the instructor is able to refer the student to a specific procedure; for example, putting on sterile gloves. The instructor will spend less time with students in reviewing techniques and procedures. We expect to develop materials covering the entire spectrum of nursing techniques taught in a basic nursing curriculum. We foresee taping selected situations in nursing which will better prepare the student for his role in interpersonal relations in nursing care.

Delta College serves the tri-county area of Bay, Midland, and Saginaw, Michigan, with a combined population of approximately 350,000. The area is a combination of

farming and diversified industry. Among the industries represented in the area are Dow Chemical, Dow Corning, General Motors, and Wickes Corporation. Many resource people are available for consultation in technical areas.

The auto-tutorial laboratory is to be located in the main building of the Delta Campus. The necessary renovations will occur in a classroom which will be readily available to students during regular scheduled class hours. The auto-tutorial laboratory is to be equipped with 20 booths, each containing the following equipment: individual lights, 8mm film cartridge projector, tape playback with earphones, nursing equipment as indicated by the specific technique under study; such as, syringes, vials, dressing trays, etc. A patient unit with larger equipment is accessible to students as well. The ATL will be open daily with an instructor available as a resource person.

The rationale is that the ATL will utilize the multi-sensory stimuli to bring the clinical situation and/or patient-nurse interaction situation to the student where he can objectively study and gain skill in a nursing technique. The lesson can be repeated several times or until the student feels reasonably sure of being able to perform the procedure in a testing situation, in the hospital laboratory or agency setting. Each student is exposed to the same learning experience and basic nursing technique, thus eliminating many of the individual faculty differences in the teaching of nursing techniques. In other words, the faculty must agree on the technique to be taught and all faculty members must therefore follow this technique in teaching students and then evaluate students in the clinical situation. (The basic technique does not eliminate individual student adaptations, rather it serves as an initial or suggested guide.) The evaluation of the student's performance will be the ultimate measure of the efficiency of these techniques. Check lists outlining the critical elements in nursing techniques to be evaluated are being designed by the Delta faculty. These check lists will be used to determine the level of student learning and/or performance in the hospital or agency laboratory.

Items of equipment needed to convert the classroom to an auto-tutorial laboratory and approximate cost:

	Each	Total
20 tapes, playbacks	$180	$3,600
7 film strip cabinets	400	2,800
7 audio tape cabinets	150	1,050
20 tables, 42x24x30 and wall construction		975
30 8mm technicolor projectors, 20 for lab and 10 for mobile		6,135
	Total	$14,560

The cost of equipping a similar room in another institution would be comparable or approximately the same as listed.

To date, in addition to the materials developed for the mathematics course we described earlier, our faculty has prepared approximately twenty-five 8mm films. We have learned a great deal by this experience of the things not to do as well as the things to do. A number of the films will be redone because they are not the quality that we had hoped to have, and some of them do not do the job we had expected. We have prepared films on handwashing technique, putting on sterile gloves, dressing change, catherization, isolation technique, tracheostomy care with an actual patient in a hospital, and colostomy care wherein a patient in a hospital demonstrates care of her own colostomy. We have prepared a number of films in the area of child development ranging from newborn wherein we filmed a child less than 12 hours old to elicit its specific responses and bathing of an infant in the newborn nursery. Children at specific ages; namely, 4 weeks old child, 8 weeks, 12 weeks, 3 months, 6 months old, 9 months old, 12 months old, 2 year old, etc., have also been filmed for classroom study.

The first film example shows isolation technique and represents the kind of thing one could do which involves multiple or complex equipment preparation. We will show

this and have an opportunity to stop at various points for discussion. The second film represents the kind of thing one could do with children in their home setting.

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[1]Postlethwait, S.N., Novak, J., and Murray, H., An Integrated Experience Approach to Learning. Minneapolis, Minnesota: Burgess Publishing Company, 1964